



## THE RUNNING SPEED DYNAMICS IN JUNIORS III, DURING THE INDOOR 1500 M AND 3000 M EVENTS

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### Abstract

**Objectives:** This study aimed to emphasize the running speed dynamics for the 1500 m and 3000 m indoor endurance events, in 14-15 years old boys and girls.

**Material and methods:** As research methods we used: the bibliographical study, the test, the statistical-mathematical method, and the graphical representation method. The results were recorded with the Alge Optic 2 electronic timing system. The participants in this research were 32 athletes, 14 and 15 year old boys and girls, runners in the 1500 m and 3000 m events.

**Results:** The results recorded by the 32 athletes are presented in tables 1, 2, 3, and 4. We found that the running speed and time recorded different values for the analyzed time sequences, during both events. The running speed recorded higher average values for the girls and boys in the 1500 m event, of 5.08 m/s, and 5.59 m/s respectively, in comparison with the 3000 m event, during which they recorded an average of 4.52 m/s (girls) and 5.12 m/s (boys).

The **conclusions** emphasize the fact that the running speed was different from contestant to another, both in the 1500 m, and the 3000 m event, that both events were won by the contestant who managed to run faster and in a constant tempo, and that the athletes did not have the ability to maintain their running speed better during the 1500 m event, than during the 3000 m event.

**Keywords:** dynamics, speed, movement, running, competition.

### Introduction

Training and competition are mentally and physically demanding activities, where the body needs to adapt to effort and stress conditions, developing an ability to endure a prolonged exposure to effort, aiming to achieve high athletic results.

Endurance, as an "ability to perform an effort of a given intensity, within a certain period of time" (P.J.L. Thompson, 1996, page 22) influences the results during sports competitions, especially during those competitions that require a continuous effort.

For the endurance events in most important competitions, we need "an unchanged effort and intensity, and the ability to resist a prolonged effort with a high intensity during a constant period of time" (M. Pradet, 2000, page 77), which is done during training and competitions, starting from childhood, and up to adulthood.

Effort adaptation to the middle distance and long distance events is based on the "energy mechanisms that play a determining role for endurance" (R. Manno, 1996, page 101), mechanisms that improve themselves both during training, and during competitions, and that "require time, and produce an increase in the energy reserves, an improvement in the functionality of the body structures" (G. Neumann, 1994, page 59).

Generally, endurance is increased between 14-15 years old, reaching 85% of the value manifested in adults at the age of 17-18, which leads us to the analysis of the running time and speed during the 1500 m and 3000 m events in juniors III, who are between 14 and 15 years of age.

According to Claparède, 1937, quoted by J. Weineck 1992, "the child is not a miniature adult, his mentality is different from the adult's not only from a quantitative, but also a qualitative point of view, in that the child is not only smaller, but also different," the child maturing with age.

The competition, as a method of increasing the effort capacity, "allows the studying of individual participation possibilities," and the possibility to assert yourself as an athlete (G. Rață, 2006, page 201), and the effort is done in "conditions of real or apparent balance, in compliance with the demands of that particular activity" (M. Cordum, 2011, page 199).

Ideally, during endurance events of athletic competitions, the runners are able to maintain their effort input "for a long period of time, without a decrease in their performance, in conditions of a good function of the body, of conquering fatigue, and quick rehabilitation" (A. Demeter, 1981, page 98).

### Material and method

The *aim* of this study was to emphasize the movement speed dynamics for the 1500 m and 3000 m indoor endurance events, in 14-15 years old boys and girls, and also this age group's characteristics. In this study, we tried to verify the following **hypotheses**:

- the running speed was different from contestant to another, both in the 1500 m, and the 3000 m event;
- both events will be won by the contestant who managed to run faster and in a constant tempo;

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- the athletes have the ability to maintain their running speed better during the 1500 m event, than during the 3000 m event.

In this study, we used the following **research methods**: the study of the specialized literature, the observation, the testing method, the statistical-mathematical method, and the graphical representation method.

This observational study comprised 32 **subjects** (third category juniors, endurance events runners, 8 female and 8 male for the 1500 m, and 8 females and 8 males for the 3000 m event).

The results were recorded with the Alge Optic 2 electronic timing system, during the Indoor Juniors III Championship, between March 24 and 25, 2012, in Bacau, Romania.

They were centralized, entabulated, and analyzed.

## Results

The results for the 1500 m event (for boys and for girls) can be found in tables 1 and 2, while the results for the 3000 m event (for boys and for girls) can be found in tables 3 and 4.

### 1. Analysis and interpretation of the results for the 1500 m event (for boys and for girls)

In order for us to emphasize the running speed dynamics for the 1500 m event (for boys and for girls), we recorded the time for the first hundred meters, and sequentially, every 200 m, for the rest of the race.

We recorded the time for 8 sequences for eight 14-15 year-old female runners and for eight boys of the same age. The data was collected and can be found in the two tables.

For the girls, as we can see in Table 1, the average value of the final time is of 4'54"93, with extreme values of 4'57"64 and 4'41"08, and the average value for the running speed is of 5.08 m/s, with extreme values of 5.03 m/s and 5.33 m/s. During the first part of the race (100 m), the average running speed for the female runners was of 5.82 m/s.

The average values are as follows: for the 1st sequence, 37.88 seconds, with a running speed of 5.27 m/s; for the 2nd sequence, 38.50 s, with a running speed of 5.19 m/s; for the 3rd sequence, 38.63 s, with a speed of 5.17 m/s; for the 4th sequence, 39.38 s, with a running speed of 5.07 m/s; for the 5th sequence, 40.38 s, with a running speed of 4.95 m/s; for the 6th sequence, 41.38 s, with a running speed of 4.83 m/s; for the 7th sequence, 37.50 s, with a running speed of 5.33 m/s.

The running speed oscillates between average group values of 5.82 m/s and 4.83 m/s during the sequences, and has an average race value of 5.08 m/s.

In first sequence of 100m, and in the last sequence of 200 m, we could observe a higher running speed (5.82 m/s, and 5.33 m/s, respectively) than the

average value, of 5.08 m/s, and higher than in the other sequences. In sequences 4, 5, and 6 the running speed value is lower than the average race speed value.

The maximum running speed values are of 6.23 m/s in the first 100 m, and of 5.88 m/s in the 7th sequence, with an average race speed value of 5.33 m/s.

In all of the sequences, the running speed value does not decrease below the average speed value.

The minimum running speed values are of 5.55 m/s in the first 100 m, and of 5.00 m/s in the 7th sequence, with an average race speed value of 5.03 m/s.

With the exception of the first sequence, in all of the others we recorded values below the group average.

As we can see, the average running speed after the first hundred meters slightly decreases throughout the sequences 1, 2, 3, 4, 5, and 6, and slightly increases in the seventh sequence. For the 8 female runners, the running speed is different, the winner being the female contestant who managed to maintain a constant and high tempo.

**Table 1 - The girls' results for the 1500 m drill**

Assessment ind.	Time (S)	100	1	2	3	4	5	6	7
<b>Girls</b>									
Average time (S)	4'54"93	17.18	37.88	38.50	38.63	39.38	40.38	41.38	37.50
A.s. (m/s)	5.08	5.82	5.27	5.19	5.17	5.07	4.95	4.83	5.33
Studev	6.60	0.74	0.99	0.93	1.30	1.19	1.69	1.77	1.85
T. max.	4'57"67	17.99	40	40	41	41	43	44	40
V. min.	5.03	5.55	5.00	5.00	4.88	4.88	4.65	4.54	5.00
T. min.	4"41"08	16.05	37	37	37	37	39	39	34
V. max	5.33	6.23	5.40	5.40	5.40	5.40	5.12	5.12	5.88

For the boys, as we can see in Table 2, the average value of the final time is of 4'28"15, with extreme values of 4'33"69 and 4'23"74, and the average value for the running speed is of 5.59 m/s, with extreme values of 5.48m/s and 5.69m/s. During the first part of the race (100 m), the average running speed for the male runners was of 6.01m/s.

The average values are as follows: for the 1st sequence, 33.50 seconds, with a running speed of 5.97m/s; for the 2nd sequence, 36.13 s, with a running speed of 5.33m/s; for the 3rd sequence, 35.63 s, with a speed of 5.61 m/s; for the 4th sequence, 36.88 s, with a running speed of 5.42m/s; for the 5th sequence, 36.63 s, with a running speed of 5.46m/s; for the 6th sequence, 36.50 s, with a running speed of 5.50m/s; for the 7th sequence, 36.25 s, with a running speed of 5.51m/s.

The running speed oscillates between average group values of 6.01m/s and 5.42 m/s during the sequences, and has an average race value of 5.59m/s.

In first sequence of 100m, and in the 1st sequence of 200 m, we could observe a higher running speed (6.01m/s, and 6.97m/s, respectively) than the average value, of 5.59m/s, and higher than in the other sequences.

In the second, fourth, fifth, sixth, and seventh sequence, the running speed value is lower than the average race speed value.

The maximum running speed values are of 6.39m/s in the first 100 m, and of 6.06m/s in the 1st sequence, and 6.25 s in the 3rd sequence, with an average race speed value of 5.69m/s.

In all of the sequences, the running speed value does not decrease below the group average speed value.

The minimum running speed values are of 5.65m/s in the first 100 m, and of 5.71m/s in the 2nd sequence, with an average race speed value of 5.48m/s.

With the exception of the first sequence, in all of the others we recorded values below the group average.

For the 8 male runners, the running speed is different, the winner being the male contestant who managed to maintain a constant and high tempo.

The results in Table 2 show that the average running speed is oscillating after the first hundred meters, with rising values in the third, fifth, sixth, and seventh sequence, and decreases in comparison with the previous sequence, in sequences 2 and 4.

**Table 2 - The boys' results for the 1500 m event**

Assessment indicators	Time (S)	100	1	2	3	4	5	6	7
<b>Boys</b>									
Average time (s)	4'28"15	16.65	33.50	36.13	35.63	36.88	36.63	36.50	36.25
Average speed (m/s)	5.59	6.01	5.97	5.53	5.61	5.42	5.46	5.50	5.51
Studev	3.27	0.61	0.76	1.25	1.77	2.17	1.19	1.69	1.91
T. max.	4'33"69	17.69	35	38	37	42	38	39	40
V. min.	5.48	5.65	5.71	5.26	5.40	4.76	5.26	5.13	5.00
T. min.	4'23"74	15.63	33	35	32	35	34	34	34
V. max	5.69	6.39	6.06	5.71	6.25	5.71	5.88	5.88	5.88

**2. Analysis and interpretation of the results for the 3000 m event (for boys and for girls)**

In order to show the running speed dynamics for the 3000 m event (boys and girls), we

recorded the time sequentially, every 200 m, making a total of 15 sequences.

For the female runners, the running speed recorded average values between 5.61 m/s, and 4.39 m/s during the sequences, with an average race speed

of 4.72 m/s. In first and in the last sequence of 200 m, we could observe a higher running speed (5.61m/s, and 4.93m/s, respectively) than the average value of 4.72m/s.

In sequences 4, 5, and 6 the running speed value is lower than the average race speed value.

The maximum running speed values are of 5.71m/s, and of 4.76m/s, with an average race speed value of 4.98m/s.

In all of the sequences, the running speed value does not decrease below the group average speed value.

The minimum running speed values are of 5.41m/s, and of 4m/s, with an average race speed value of 4.57m/s.

In all sequences we recorded values below the group average. For the 8 female runners, the running speed is different, the winner being the female contestant who managed to maintain a constant and high tempo.

As we can see in Table 3, the average running speed decreases after the first 200 m sequence, throughout the sequences 2-13, and increases during the sequences 14 and 15.

**Table 3 - The girls' results for the 3000 m event**

Assessment ind.	Time (S)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Girls																
A. t. (s)	10' 35" 33	35.63	38.00	40.38	41.63	42.38	42.13	42.38	43.63	44.00	44.38	44.88	45.13	45.50	44.63	40.50
A.s. (m/s)	4.72	5.61	5.26	4.95	4.80	4.71	4.74	4.71	4.58	4.54	4.51	4.46	4.43	4.39	4.81	4.93
Studev	22.18	0.92	0.76	2.00	1.92	2.13	1.55	1.69	2.20	2.07	1.92	2.75	2.47	3.34	3.58	3.51
T. max.	10'56"16	37	39	43	44	45	44	45	46	47	47	48	48	50	50	48
V. min.	4.57	5.41	5.13	4.65	4.54	4.44	4.54	4.44	4.34	4.25	4.25	4.16	4.16	4.00	4.00	4.16
T. min.	10'02"09	35	37	38	39	40	40	40	41	41	42	40	42	42	38	37
V. max	4.98	5.71	5.41	5.26	5.13	5.00	5.00	5.00	4.87	4.87	4.76	5.00	4.76	4.76	5.26	5.41

For the boys, as we can see in Table 4, the average value of the final time is of 9'45"64, with extreme values of 9'57"72 and 9'33"73, and the average value for the running speed is of 5.12 m/s, with extreme values of 5.99m/s and 4.89m/s.

In first and in the last sequence of 200 m, we could observe a higher running speed (5.46m/s, and 5.99m/s, respectively) than the average speed, of 5.12m/s, and higher in 6 sequences of the 15.

In sequences 6, 7, 8, 9, 10, 11, 12, 13, and 14 the running speed value is lower than the average race speed value.

The maximum running speed values are of 5.46m/s, and of 6.90 m/s, with an average race speed value of 5.22m/s. In 5 sequences, the running speed value is below the group average speed value.

The minimum running speed values are of 5.32m/s, and of 4.65m/s, with an average race speed value of 5.01m/s. In five sequences we recorded values below the group average.

For the 8 male runners, the running speed is different, the winner being the male contestant who managed to maintain a constant and high tempo.

**Table 4 - The boys' results for the 3000 m event**

Assessment ind.	Time (S)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Girls																
A. t. (s)	9'45"64	36.64	36.88	37.13	38.25	38.5	40.5	39.63	40.0	40.5	40.5	40.63	40.88	40.63	40.07	33.55
A.s. (m/s)	5.12	5.46	5.42	5.39	5.23	5.19	4.93	5.04	5.00	4.93	4.93	4.92	4.89	4.92	4.99	5.99
Studev	11.28	0.49	0.99	0.99	0.46	0.53	0.5	1.06	1.0	0.76	0.5	1.06	1.64	1.60	2.45	6.71
T. max.	9'57"72	37.56	39	39	39	39	41	42	41	42	41	42	43	43	43	41
V. min.	5.01	5.32	5.19	5.19	5.19	5.19	4.88	4.76	4.88	4.76	4.88	4.76	4.65	4.65	4.65	4.88
T. min.	9'33"73	36.73	37	38	38	39	40	39	39	40	40	40	40	39	39	29
V. max	5.22	5.46	5.41	5.26	5.26	5.13	5.00	5.13	5.13	5.0	5.00	5.00	5.00	5.13	5.13	6.90



### Discussions

After comparing the girls' results from the 1500 m event (an average time of 4'54"93, and an average running speed of 5.08 m/s) with the boys' results (average time of 4'33"69, and an average running speed of 5.59 m/s), we can observe that the boys' values are better than the girls'.

The best time is of 4"41"08 for the girls, and of 4'23"74 for the boys, whereas the average running speed is of 5.33 m/s for the best female runner, and of 6.59 m/s for the best male runner.

We also emphasize the fact that the girls run at certain points during the race with the speed of 6.23 m/s, and the boys, with 6.39 m/s.

In the 1500 m event, the standard deviation for the girls has values between 5.08 and 5.82, and for the boys, the values are between 3.27 and 0.61.

The values show a homogeneity in the groups we analyzed.

After comparing the girls' results from the 3000 m event (an average time of 10'35"33, and an average running speed of 4.72m/s) with the boys' results (average time of 9'45"64, and an average running speed of 5.12m/s), we can observe that the boys' values are better than the girls'.

The best time is of 10"02"09 for the girls, and of 9'33"73 for the boys, whereas the average running speed is of 4.98 m/s for the best female runner, and of 5.22 m/s for the best male runner.

We also emphasize the fact that the girls run at certain points during the race with the speed of 5.71 and 5.41m/s, and the boys, with 6.80 and 5.71m/s.

In the 3000 m event, the standard deviation for the girls has values between 0.76 and 3.51, and for the boys, the values are between 6.71 and 0.49, values that show a low homogeneity in the analyzed groups.

### Conclusions

After analyzing the data, we could draw the following conclusions:

- 1.the hypothesis stating that the running speed was different from contestant to another, both in the 1500 m, and the 3000 m event, was confirmed;
- 2.the hypothesis stating that both events will be won by the contestant who managed to run faster and in a constant tempo, was confirmed;
3. the hypothesis stating that the athletes had the ability to maintain their running speed better during the 1500 m event, than during the 3000 m event, was not confirmed, the speed recording a decreasing dynamics;
- 4.the average running speed in the 1500 m event is, for the girls, of 5.08, with a maximum speed of 6.23 m/s, and for the boys, of 5.59 m/s, with a maximum of 6.39. At a first look there are no major differences, but looked in time, they are obvious.
- 5.in the 1500 m event, the average time recorded by the girls is of 4'54"93, which is less than the boys' average time, of 4'33"69;
- 6.in the 3000 m event, the girls' average running speed of 4.72 m/s is lower than the boys' average speed of 5.12 m/s.

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